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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/720,700	12/29/2000	Yasushi Maruta	P/1929-75	5172

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EXAMINER	
BAYARD, EMMANUEL	
ART UNIT	**PAPER NUMBER**
2631	4

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/720,700	MARUTA ET AL.
	Examiner	Art Unit
	Emmanuel Bayard	2631

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 29 December 2000.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-19 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-19 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1, 7-9, 15, 17-19 are rejected under 35 U.S.C. 102(e) as being anticipated by Keskitalo et al U.S. Patent NO 6,091,788.

As per claim 1, Keskitalo et al discloses an adaptive transceiver device of a CDMA (Code Division Multiple Access) system characterized by comprising: path search means for calculating path level information and path delay time information from antenna reception signals (see fig.8b element 802 and abstract col.17, lines 5-20 and col.18, lines 65-67); M (M is a positive integer) adaptive reception units for receiving N (N is a positive integer) antenna reception signals, forming reception directivity patterns each having a gain in the direction of a desired wave signal every path delay time, receiving the desired wave signals, and suppressing interference wave signals (see figs. 4-5, 7 elements 400-404, 500, 700-704 and col.6, lines 20-21 and col.9, lines 33-40 and col.15, lines 57-67); reception antenna weight selection means for selecting reception antenna weights for L (L is an integer equal to or smaller than M) transmission paths among the M reception antenna weights by using the path level information (see col.6, lines 31-45 and col.16,lines 37-45); L transmission antenna weight control units (see figs. 5, 6a, 6b elements 512, 612 and col.7, lines 55-67 and col.10, lines 15-35 and col.14, lines

33-40, 55-67) for determining transmission antenna weights for forming transmission directivity patterns by using outputs from the reception 20 antenna weight selection means; and an adaptive transmission unit (see figs. 5-7 elements 502, 606, 770 and col.10, lines 5, 35 and col.18, lines 1-49) for forming the transmission directivity pattern having a gain (see abstract and col.3, line 57) in a user direction by using the transmission antenna weight which is an output from the transmission antenna weight control unit and outputting N combining (see figs. 6b, 7, 9 elements 650, 754 and col.14, lines 60-62 and col.20,lines 50-55 and col.23,lines 49-55) antenna transmission signals for transmitting the desired wave signal.

As per claim 7, Keskitalo does teach, the reception antenna weight selection means receives M reception antenna weights which are outputs from the M adaptive reception sub-blocks, path level information which is an output from the path search means, a path level threshold value, and a maximum transmission count Lmax, and selects a selection reception antenna weight corresponding to L paths the number of which is not larger than the maximum transmission count Lmax and which has a level set within the range of the level of the maximum path to the path level threshold value from the M reception antenna weights (see figs. 4-9 and the col.1-col.19).

As per claim 8, Keskitalo does teach the transmission antenna weight control unit has: an arrival direction estimation unit which receives the selection reception antenna weight to estimate an estimated arrival direction from the selection reception antenna weight; and a transmission antenna weight generation means for calculating a transmission antenna weight for forming a directivity pattern having a gain in the estimated arrival direction which is an output from the arrival direction estimation unit (see specification).

As per claim 9, Keskitalo does teach the transmission antenna weight control has: an arrival direction estimation unit which receives the selection reception antenna weight to estimate an estimated arrival direction from the selection reception antenna weight; transmission direction prediction means for predicting a transmission direction on the basis of the estimated arrival direction which is an output from the arrival direction estimation unit; and transmission antenna weight generation means for calculating a transmission antenna weight for forming a directivity pattern having a gain in the prediction transmission direction which is an output from the transmission direction prediction means (see specification).

As per claim 15, Keskitalo does teach the adaptive transmission unit has: L adaptive transmission sub-blocks which receive L transmission antenna weights which are outputs from the L transmission antenna weight control units and a transmission signal and which output N antenna transmission signals for forming a directivity pattern having a gain in a user direction on the basis of the transmission antenna weights and transmitting a desired wave signal; and N adders (see fig.9 elements 906-910) for synthesizing the antenna transmission signals every antenna to output N combining antenna signals (see element 650 and col.14, lines 60-61).

As per claim 17, Keskitalo does teach each of the adaptive transmission sub blocks has: a transmission weighting combining (see element 650 and col.14, lines 60-61) unit which receives the transmission antenna weight and the transmission signal to form a transmission directivity pattern; and N spreading means (see col.9, lines 63-67) for performing spectrum spreading to each of the N antenna transmission signals by using a pseudo random code of a desired wave signal.

As per claim 18, Keskitalo does teach in that the reception antenna weight is updated every symbol, and the step of updating the reception antenna weight is determined depending on the degree of convergence of the reception antenna weight (see col.10, lines 38-45 and col.12, lines 7-8).

As per claim 19, Keskitalo does teach, characterized in that the transmission weighting combining unit has N complex multipliers which receive the transmission antenna weight and the transmission signal and which multiply the transmission signal by N complex transmission antenna weights (see the specification and col.14, lines 12-30).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 2-6, 10-14 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Keskitalo et al U.S. patent No 6,091, 788 in view of Dobrica U.S. Patent No 6,070,086.

As per claim 2, Keskitalo teaches adaptive reception unit has: M delay means which receive the N antenna reception signals and the path delay time information which is an output from the path search means and which match timings depending on the path delay times of M multi-paths (see figs. 4-9 and col.1, lines 10-11); M adaptive reception sub-blocks for forming the reception directivity patterns having gains in the directions of the M multi-paths, suppressing the interference wave signal, and receiving and demodulating the desired wave signal (see fig.6

elements 620, 628 and fig.8 elements 804, 806); an adder (see fig.8 element 608) for synthesizing M demodulation signals.

However Keskitalo does not teach a decision means for performing hard decision to output a decision symbol.

Dobrica teaches a decision means for performing hard decision to output a decision symbol (see fig.3 element 101 and col.10, lines 23-24).

It would have been obvious to one of ordinary skill in the art to implement the teaching of Dobrica into Keskitalo as to precisely measure the EbI0 (ratio of signal energy per bit to the interference power spectral density) of each associated mobile station as taught by Dobrica (see col.2, lines 1-3 and col.10, lines 23-33).

As per claim 3, Keskitalo does teach the antenna reception signal is a code division multiple access (CDMA) signal, and each of the M adaptive reception sub-blocks has: N despreading means (see col.12, line 28) which receive the N antenna reception signals and the decision symbol and performs despreading to each of the antenna reception signals by using a pseudo random code of the desired wave signal; a reception weighting combining unit (see element 608) for forming the reception directivity pattern; a demodulation unit (see element 808)for performing the transmission path estimation; a multiplier for multiplying the decision symbol (see col.13, line 36) by a complex transmission (see col.14, lines 12-25) path estimation value which is an output from the demodulation unit to cancel a phase change caused by carrier wave phase synchronization; error detection means for subtracting each output from the despreading means from an output from the multiplier; delay means for delaying outputs from the N despreading means (see col.12, line 28) depending on the process times of the reception

weighting combining means (608), the demodulation means (808) and reception antenna weight control means (512). Furthermore implementing such transceiver for outputting the reception antenna weight on the basis of the minimum mean square error (MMSE) standards such that the average power of the reception antenna weight control error is minimized by using an output from the delay means and the reception antenna weight control error would have been obvious to one skill in the art as to precisely measure the EbI0 (ratio of signal energy per bit to the interference power spectral density) of each associated mobile station .

As per claim 4, Keskitalo teaches that the reception weighting combining unit has: N complex multipliers which receive the N antenna reception signals and the reception antenna weights and which multiply the reception signals by N complex reception antenna weights; and an adder for synthesizing respective outputs from the N complex multipliers (see figs. 5-7, and 9 and specification. Furthermore implementing such teaching to be perform by a hard decision would have been obvious to one skill in the art as to precisely measure the EbI0 (ratio of signal energy per bit to the interference power spectral density) of each associated mobile station

As per claim 5, Keskitalo teaches the demodulation means has: transmission path estimation means which receives an output from the weighting combining unit to estimate the amplitude and the phase of a carrier wave; complex conjugate operation means for calculating a complex conjugate of complex transmission path estimation values which are output from the transmission path estimation means; and a multiplier for multiplying an output from the complex conjugate operation means by an output from the despreading means to perform carrier wave phase synchronization and, at the same time, to perform weighting for synthesizing a maximum ratio (see claim 1 above and specification). Furthermore implementing such teaching to be

perform by a hard decision would have been obvious to one skill in the art as to precisely measure the EbI0 (ratio of signal energy per bit to the interference power spectral density) of each associated mobile station

As per calim 6, Keskitalo teaches the demodulation means has: transmission path estimation means which receives an output from the weighting combining unit to estimate the amplitude and the phase of a carrier wave; complex conjugate operation means for calculating a complex conjugate of complex transmission path estimation values which are output from the transmission path estimation means; and a multiplier for multiplying an output from the complex conjugate operation means by an output from the dispreading means to perform carrier wave phase synchronization and, at the same time, to perform weighting for synthesizing a maximum ratio (see claim 1 above and specification). Furthermore implementing such teaching to be perform by a hard decision would have been obvious to one skill in the art as to precisely measure the EbI0 (ratio of signal energy per bit to the interference power spectral density) of each associated mobile station

As per claim 10, Keskitalo teaches the reception antenna weight selection means receives M reception antenna weights which are outputs from the M adaptive reception sub-blocks, path level information which is an output from the path search means, a path level threshold value, and a maximum transmission count Lmax, and selects a selection reception antenna weight corresponding to L paths the number of which is not larger than the maximum transmission count Lmax and which has a level set within the range of the level of the maximum path to the path level threshold value from the M reception antenna weights (see claim 1 above and specification). Furthermore implementing such teaching to be perform by a hard decision would

have been obvious to one skill in the art as to precisely measure the EbI0 (ratio of signal energy per bit to the interference power spectral density) of each associated mobile station

As per claim 11, Keskitalo would teach an arrival direction estimation unit which receives the selection reception antenna weight to estimate an estimated arrival direction from the selection reception antenna weight; and transmission antenna weight generation means for calculating a transmission antenna weight for forming a directivity pattern having a gain in the estimated arrival direction which is an output from the arrival direction estimation as to precisely measure the EbI0 (ratio of signal energy per bit to the interference power spectral density) of each associated mobile station.

As per claims 12-14, Keskitalo would teach an arrival direction estimation unit which receives the selection reception antenna weight to estimate an estimated arrival direction from the selection reception antenna weight; transmission direction prediction means for predicting a transmission direction on the basis of the estimated arrival direction which is an output from the arrival direction estimation unit; and transmission antenna weight generation means for calculating a transmission antenna weight for forming a directivity pattern having a gain in the prediction transmission direction which is an output from the transmission direction prediction means as to precisely measure the EbI0 (ratio of signal energy per bit to the interference power spectral density) of each associated mobile station.

As per claim 16, Keskitalo teach L adaptive transmission sub-blocks which receive L transmission antenna weights which are outputs from the L transmission antenna weight control units and a transmission signal and which output N antenna transmission signals for forming a directivity pattern having a gain in a user direction on the basis of the transmission antenna

weights and transmitting a desired wave signal; and N adders for synthesizing the antenna transmission signals every antenna to output N combining antenna signals (see claim 1 above and specification). Furthermore implementing such teaching to be perform by a hard decision would have been obvious to one skill in the art as to precisely measure the EbI0 (ratio of signal energy per bit to the interference power spectral density) of each associated mobile station

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Borras et al U.S. patent No 5,303,240 teaches a telecommunication system.

Whinnett U.S. patent No 5,999,826 teaches devices for transmitter path weights.

Matsuoka et al U.S. patent No 6,061,553 teaches an adaptive antenna.

Kowalski et al U.S. Patent No 6,085,104 teaches a pilot aided, time varying finite impulse response.

Azuma U.S. Patent No 5,960,330 teaches a diversity gain.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Emmanuel Bayard whose telephone number is (703) 308-9573. The examiner can normally be reached on Monday-Thursday from 8:00 AM - 5:30 PM. The examiner can also be reached on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad H. Ghayour, can be reached on (703) 306-3034. The fax phone number for this Group is (703) 872-9314.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 305-3800.

Bayard Emmanuel

Primary Examiner

2/4/04